Space validation of DFB Laser Module at 1.55 µm - Objectives

State-of-the-art distributed feedback (DFB) laser modules integrated with a photodiode monitor provide excellent long-term wavelength stability. By adopting unique and compact configuration, wavelength deviations of as small as a few picometers have been achieved. The laser modules are improved also in the scope of high power, high reliability, and wavelength tunability. Available reliability test results of DFB laser diodes and modules indicates that a sufficiently long lifetime of more than 12 years and a small wavelength drift of less than 3 pm are possible. However, a space validation of these type of lasers has not been performed at the required wavelength of 1,55 µm. Due to the many potential applications for the DFB Lasers, including Intra and Inter-satellite communication, a space validation is now required.

This activity is part of the ECI program. Its objectives are to design, develop, manufacture and space validate a DFB Laser Module at 1,55 µm using a European supplier. The intention in this activity is not to address DFB fiber lasers, and focus on Semiconductor lasers only.
The space validation exercise will be performed according to the ECSS-ST-60-05-Rev1, where the LAT (Lot Acceptance Test) will be replaced by an Evaluation program based on the new ETP for Laser Guide line as in [RD-1]. The number of DFB Laser modules to be submitted to the Evaluation test program shall be subject to negotiation, but the Bid shall present a ETP plan with the proposal for ESA consideration.

It is considered that these objectives are achievable through the following steps:
- Consolidation of the module technical requirements
- Delta design activities, including PDR, CDR reviews.
- Prototyping of the finalized design.
- Definition and performance of a space validation testing

The contractor shall also guarantee a supply of the DFB Laser for a period of at least 5 years.
It is anticipated that the bidder shall first secure the performance requirements, then control the temperature and drive current to control wavelength drift.